

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Animal Foods

- We, CEREBOs FOODS LIMITED, a British Company of Cerebos House, Willesden, London, N.W.10, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- This invention is concerned with improvements in or relating to animal foods, especially such foods intended for dogs.
- At the present time dogs are widely fed on diets containing substantial proportions of meat, either in the form of fresh meat or canned meat products. Due to the constantly rising cost of meat products, increasing attention is being directed to the production of dog foods which are cheaper and which nevertheless are able to satisfy the nutritional requirements of the dog. Such foods include cereal, and indeed it is thought that a mixture of meat and cereal can provide dogs with more beneficial and balanced diet does meat alone.
- One problem with cereal is to present the food in an attractive form. Dogs (and other animals such as those of the cat family) enjoy lumpy foods, and do not take happily to the homogeneous and pasty cereal products. It is one object of the present invention to provide a process for preparing products comprising low temperature-cooked cereal, with or without other foods such as for example meat, which are in the form of hard cubes or pellets having little tendency to powder due to attrition or to disintegrate in the presence of liquid such as gravy.
- According to one feature of the present invention, there is provided a process for the preparation of an animal food, particularly dog foods, in which a food mix comprising cereal and water is low temperature-cooked to effect gelatinisation of starch, the mix being extruded and/or after low temperature-cooking to provide shape food masses having a density of at least 1.1 gms/cc with each mass bonded by gelatinised starch.
- According to a further feature of the present invention, there is provided an animal food, particularly a dog food, which comprises shaped food masses (particularly in the form of so-called pellets or cubes) containing low temperature-cooked cereal and having a density of at least 1.1 gms/cc with each mass bonded by gelatinised starch. The animal food according to the invention preferably contains 12—13% by weight of water.
- By the expression "low temperature cooking" as used herein we mean heating at a temperature which is sufficiently high to effect gelatinisation of starch but which is low as compared with the baking temperatures commonly utilised in cooking cereals. The temperature used will conveniently be below 120°C, and advantageously below 100°C.
- The shaped food masses according to the invention are in generally hard masses of relatively high density, for example of from 1.1 to 1.5 gms./cc. and preferably from 1.2 to 1.3 gms./cc. They conveniently take the form of pellets or cubes, and indeed the process according to the invention is advantageously carried out on conventional pelleting or cubing machines, as described below.
- The products are particularly useful in the provision of canned meat and/or gravy containing foods. According to a still further feature of the present invention, there is thus provided a canned animal food product comprising an animal food according to the present invention as hereinbefore defined together with meat and/or meat gravy. Canned animal

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food products according to the invention can thus for example consist of a mixture of cereal pellets or cubes (prepared by the process according to the invention) and lumps of meat dispersed in a gravy. Alternatively the food mix used in the process according to the invention may include meat particles in addition to the cereal and water in which case the canned food can conveniently be simply a dispersion of the pellets or cubes in a gravy without a separate meat ingredient. Such canned products are particularly satisfactory as there is in general little tendency for the pellets or cubes to disintegrate in the presence of liquid. It is an advantage of the cereal products according to the invention that meat and/or gravy mixes containing this can be cooked e.g. in the can in general without adversely affecting the shaped cereal product.

Whilst the shaped food masses according to the invention are particularly useful for canned food products, they may also take the form of dog biscuits and the like sold in dry form. Such products need to be hard to avoid powdering during for example packing, storage and transport, and the shaped food masses according to the invention can be particularly hard products of high density.

As stated above, the process according to the invention can be carried out on a conventional pelleting or cubing machine. Such a machine in general comprises a rotating bowl with apertures formed in the side thereof, and rollers positioned inside the bowl which also rotate and serve to squeeze food mix contained in the bowl through the apertures to effect extrusion. The extruded material is then cut as it emerges from the apertures to form so-called pellets or cubes. When using this type of machine for the process according to the invention, heating means have to be incorporated whereby the food mix can be heated prior to or during extrusion. One convenient method of heating is to use smooth rollers in the machine; this results in heating from shearing friction. Alternatively, a heater may be positioned above the bowl or hot air or steam directed on to the rollers in the bowl. The apertures can conveniently be circular with a diameter of from one-quarter to three-quarters of an inch, preferably about one-half of an inch. If the extruded mix is then cut into one-quarter to three-quarter inch lengths, this gives pellets or cubes of a particularly suitable size for dog foods.

The amount of water included in the food mix should in general be sufficient to cause gelatinisation of most of the starch during low temperature-cooking. Thus, the amount of water is preferably from 18 to 25% by weight of the food mix, although of course the preferred amount of water does vary according to the proportion of starch in the food mix. During the heating, a proportion of the water will be lost as steam. In a preferred process

according to the invention the heating is effected prior to extrusion, and a substantial amount of the steam formed as a result of the heating is released prior to extrusion. Thus, using the conventional pelleting or cubing machine, a substantial amount of the steam formed as a result of the heating escapes out of the top of the bowl rather than through the apertures. The disadvantage of steam being formed during or after extrusion is that the escape of steam may cause unwanted swelling of the extruded product; for this reason it is desired that at least a substantial amount of the steam should be released prior to extrusion. After extrusion, the shaped food masses are preferably passed through a drier to reduce their water content, for example to from 12 to 13% by weight.

The low temperature-cooked cereal may for example comprise wheat, maize, barley or oats; a preferred cereal is wheat flour. The food mix may also, if desired, contain soya beans and/or a high digestability protein such as for example a fish or meat protein, e.g. meat and bone meal (as derived for example in the conventional rendering of butchers residues), white fish meal or herring meal, wet meat residue and offals.

The ingredients of the food mix are advantageously reduced to a small particle size, preferably to an average particle size (by number) from 0.015 to 0.040 ins. advantageously 0.015 to 0.020 ins. prior to treatment in accordance with the present invention.

Various other ingredients in addition to cereal, high digestability protein and water may be included in the food mix if so desired, and it is possible to arrange that the product satisfies the entire nutritional requirements of the animal. With dog foods, the nature of the additional ingredients may for example be varied to provide the varying needs of different breeds of dog.

The apparatus used in the example is illustrated in the accompanying drawing. The apparatus comprises a circular wrapper plate 1 having a bridge 2 diametrically positioned across it. The bridge 2 supports roller spindles 5, the position of the roller spindles being adjustable by means of an adjusting screw 3 associated with adjusting links 4 bolted to the bridge 2. The roller spindles 5 carry roller shells and bearings 6 which are positioned below the bridge 2 within the wrapper plate 1. A circular hopper 8 coaxial with the wrapper plate 1 surrounds the rollers 6, and serves to feed material between the rollers 6 and a rotatable circular die 10 positioned below the hopper 8. Material sandwiched between the rollers 6 and the die 10 is forced through holes of $\frac{1}{2}$ " diameter in the die and emerges from the outside circumferential surface of the die. A retaining angle 9 serves to hold back any material thrown above the level of the die and there are openings in the hopper

8 to allow such material to return into the centre of the die. A knife 7 is provided supported on the bridge 2 which serves to cut material emerging from the die holes into pellets. A sifting plate 12 is provided which is rotatable with the die on to which pellets emerging from the holes in the die 10 can fall, and a deflector plate 11 on the wrapper plate 1 serves to guide pellets from the sifting plate 12 out through a hole in the wrapper plate 1. A radiant heater (not shown) is provided whereby material in the hopper 8 can be heated prior to extrusion through the die holes.

15 In use, a mixture of cereal and water can be fed into the hopper 8. Heat from the radiant heater cooks the mixture and gelatinises the starch, whereafter the mixture is forced through the holes in the die by rotation of the die in a clockwise direction. The clearance between the rollers 6 and the die face is adjustable by means of the adjusting screw 3. As the pellets emerge from the outside of the die they are cut off to length by the knife 7. 25 The pellets fall on to the sifting plate 12 which rotates with the die, and they are ejected from the wrapper plate 1 by the deflector 11. Any crumbs produced pass through the sifting plate into a separate exit.

30 In a modification of the apparatus described above, the rollers 6 are smooth rollers whereby the material fed into the apparatus is heated by shearing friction. Where such smooth rollers are employed, the radiant heater may be dispensed with if so desired.

35 For the better understanding of the invention, the following examples, in which all percentages are by weight, are given by way of illustration only:—

40 EXAMPLE 1

Wheat flour, soya bean meal and fish meal are prepared so that they all pass through a British Standards 22 mesh sieve. They are mixed in equal proportions and with the addition of sufficient water to give a final moisture content of about 25% until the whole batch is homogeneous and reasonably free-flowing.

45 The die of a cubing machine as described above equipped with smooth rollers is raised to an operating temperature of about 80°C. The mixture of ingredients is fed into the machine at such a rate that the temperature of the pellets produced is maintained at about 60°C. From the cuber the hot pellets are 50 conveyed to a drying chamber with a forced air circulation of around 80°C. The pellets are thereby dried in a period of about 45 minutes to a moisture content of approximately 12%. The pellets obtained have a 55 density of from 1.1 to 1.3 grams/cc. 60

EXAMPLE 2

Cereal pellets are prepared from the following ingredients:

1) Wheat flour

This has an average analysis as follows:—

Moisture content 14%

Total protein 9%

The wheat flour is ground so that not more than 40% fails to pass a No. 100 B.S. sieve.

2) Soyabean Meal

This has an average analysis as follows:—

Moisture content 13%

Total protein 43%

Crude fibre 6%

Oil 1%

The soyabean meal is ground so that not more than 8% fails to pass a No. 22 B.S. sieve.

The wheat flour and soyabean meal are mixed with water in the following proportions:—

Soyabean meal 44.25%

Wheat flour 44.25%

Additional water 11.5%

The additional water is sufficient to give a total water content for the mixture of about 25%.

The die of a cubing machine as described above equipped with smooth rollers is raised to an operating temperature of about 80°C. The mixture of ingredients is fed into the machine at such a rate that the temperature of the pellets produced is maintained at about 60°C. The pellets formed measure about $\frac{1}{2}$ " diameter by $\frac{1}{2}$ " long, and are conveyed from the cuber to a drying chamber with a forced air circulation of around 80°C. The pellets are thereby dried to a moisture content of about 12%. The pellets obtained have a density of from 1.1 to 1.3 grams/cc.

As a separate operation, meat pieces are formed 1" square so that 50—60% fail to pass a No. 5 B.S. sieve.

The cereal pellets, meat and gravy are mixed, care being taken not to reduce the size of the cereal pellets or meat pieces. The mix obtained is filled into 8oz. or 16 oz. cans which are steam *in vacuo* and processed at 260°F for 45 minutes (in the case of 8 oz. cans) and for 54 minutes (in the case of 16 oz. cans).

WHAT WE CLAIM IS:—

1. A process for the preparation of an animal food in which a food mix comprising cereal and water is low temperature-cooked to effect gelatinisation of starch, the mix being extruded during and/or after low temperature-cooking to provide shaped food masses having a density of at least 1.1 gms/cc with each mass bonded by gelatinised starch.

2. A process as claimed in claim 1 in which the food mix prior to low temperature-cooking contains from 18 to 25% by weight of water.

3. A process as claimed in either of claims 1 and 2 in which the food mix contains wheat as cereal.

4. A process as claimed in any of the preceding claims in which the food mix contains maize, barley or oats as cereal.
- 5 5. A process as claimed in any of the preceding claims in which the food mix contains fish or meat protein.
6. A process as claimed in any of the preceding claims in which the solids of the food mix have an average particle size (by number) from 0.015 to 0.040 inches.
- 10 7. A process as claimed in claim 6 in which the solids of the food mix have an average particle size (by number) from 0.015 to 0.020 inches.
- 15 8. A process as claimed in any of the preceding claims in which the low temperature-cooking and extrusion are effected to provide shaped food masses having a density of from 1.1 to 1.5 gms/cc.
- 20 9. A process as claimed in claim 8 in which the low temperature-cooking and extrusion are effected to provide shaped food masses having a density of from 1.2 to 1.3 gms/cc.
- 25 10. A process as claimed in any of the preceding claims in which the shaped food masses are dried after extrusion to give a water content of from 12 to 13% by weight.
- 30 11. A process as claimed in claim 1 substantially as herein described.
12. A process as claimed in claim 1 substantially as herein described in the Examples.
13. Animal foods when prepared by a process as claimed in any of the preceding claims.
- 35 14. Dog foods when prepared by a process as claimed in any of claims 1 to 12.
15. An animal food which comprises shaped food masses containing low temperature-cooked cereal and having a density of at least 1.1 gms/cc with each mass bonded by gelatinised starch.
- 40 16. An animal food as claimed in claim 15 in the form of pellets or cubes.
17. An animal food as claimed in either of claims 15 and 16 in which the shaped food masses have a density of from 1.1 to 1.5 gms/cc.
- 45 18. An animal food as claimed in claim 17 in which the shaped food masses have a density of from 1.2 to 1.3 gms/cc.
19. An animal food as claimed in any of claims 15 to 18 in which the shaped food masses have a water content of from 12 to 13% by weight.
- 55 20. An animal food as claimed in any of claims 15 to 19 adapted for use as a dog food.
21. An animal food as claimed in claim 15 substantially as herein described.
- 60 22. A canned animal food product comprising an animal food as claimed in any of claims 13 to 21 incorporated into a can together with meat and/or gravity.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

